4.0 ALTERNATIVES

This chapter describes the alternatives considered in this Draft Environmental Impact Statement (DEIS). The chapter begins with descriptions of all the alternatives considered during the course of the study. A discussion of alternatives that were eliminated from further consideration follows. Then the alternatives that have been retained for further study and evaluation are discussed. These alternatives are designated as the Practical Alternatives. Transportation actions that do not adequately address the purpose and need for the project and cannot be retained as stand-alone alternatives, but that are compatible with the Practical Alternatives, are also discussed. Finally, an evaluation of the Practical Alternatives in relation to the goals of the study is provided.

Upon completion of public review of the DEIS and after public hearings are held to gather additional public input, an alternative, called the Recommended Alternative, will be selected. The selection will be based on public input, comparison of social, economic and environmental impacts, benefit to the traveling public, and the extent to which the alternative meets the purpose and need of the project and its goals and objectives. A Final Environmental Impact Statement (FEIS) will be prepared to document the public involvement process and the selection of the Recommended Alternative. The Federal Highway Administration (FHWA) will prepare a Record of Decision (ROD) to document its decision to select the Recommended Alternative. The ROD will be available from the FHWA and MDOT.

4.1 Alternatives Considered

Several alternatives were developed and evaluated to determine the best option for addressing current and projected travel demands, reducing traffic crashes, and rehabilitating the pavement and bridges on I-94. Some were eliminated from the study because they did not meet the purpose and need of the study. Other alternatives did meet the goals, purpose, and need of the study and were retained for further study. Finally, some of the alternatives could not by themselves meet the goals or purpose and need of the project but could be implemented to augment the alternatives retained. All of the alternatives evaluated and the status of each are listed below.

- No-Build – Retained as a Basis of Comparison
- Enhanced No-Build – Retained
- Use of Grand Trunk Western/Conrail Rail Corridor as a Truck Route – Eliminated from Further Consideration
- Reconstruct I-94: Add High-Occupancy Vehicle (HOV) Lanes without Improvements to the M-10 and I-75 Interchanges – Eliminated from Further Consideration
- Reconstruct I-94: Add Unconventional Service Drives without Improvements to the M-10 and I-75 Interchanges – Eliminated from Further Consideration
- Reconstruct I-94: Add Lanes and Provide Reserved Space for Future Expansion without Improvements to the M-10 and I-75 Interchanges – Eliminated from Further Consideration
- Reconstruct I-94: Improvements to M-10 and I-75 Interchanges with Collector-Distributor Roads – Eliminated from Further Consideration
- Reconstruct I-94: Original Design of Improvements to the M-10 and I-75

Interchanges with Continuous Service Drives – Eliminated from Further Consideration

- Reconstruct I-94: Original Design of Improvements to the M-10 and I-75 Interchanges with Braided Ramps – Eliminated from Further Consideration
- Reconstruct I-94: Refined Design of Improvements to the M-10 and I-75 Interchanges with Continuous Service Drives – Eliminated from Further Study
- Reconstruct I-94: Refined Design of Improvements to the M-10 and I-75 Interchanges with Braided Ramps – Eliminated from Further Study
- Reconstruct I-94: Refined Design of Improvements to the M-10 and I-75 Interchanges with Design Elements of Continuous Service Drives and Braided Ramps – Retained for Further Study
- Transportation Systems Management (TSM) and Intelligent Transportation system (ITS) – Retained as Compatible with a Practical Alternative, but Eliminated as a Stand-Alone Alternative
- Transit – Retained as Compatible with a Practical Alternative, but Eliminated as a Stand-Alone Alternative
  - Modifications to Existing Bus Service
  - Bus Rapid Transit (BRT)
  - Light Rail

These alternatives were evaluated based on the purpose, need, and goals and objectives of the project. A discussion of each alternative follows.

4.2 Alternatives Eliminated from Further Consideration

After consideration and evaluation, some alternatives were eliminated from further consideration because they did not meet the purpose and need of the project or the goals and objectives established for the study. The alternatives and the reasons for eliminating them from further consideration are described in this section.

4.2.1 Use of Grand Trunk Western/Conrail Rail Corridor as a Truck Route

This alternative would use the Grand Trunk Western/Conrail rail corridor as a truck route (Figure 4-1). Early in the study process, consideration was given to using the existing rail corridor that runs parallel to and north of I-94 as a truck route. It was anticipated that a set of tracks would be vacated as a result of the consolidation of Grand Truck Western and Conrail operations. The alternative would convert the vacated right-of-way from rail use to roadway use. However, numerous factors present serious problems. This alternative was eliminated from the study for several reasons:

- Existing active rail service to industrial users would be lost because of track crossings, configurations, and switching requirements.
- The existing elevation of the railway grade is approximately 12 feet above ground level and would preclude access to local roads.
- In a number of areas, commercial and industrial buildings are located adjacent to rail structures. To access local streets from the proposed roadway, the buildings located adjacent to the rail structures would need to be acquired and removed.

- The proposed new roadway would have to be shifted to the south to allow for either construction of ramps or lowering the grade of the roadway to cross-city streets at grade.
- New right-of-way would have to be acquired and homes and businesses would be displaced.
- The proposal would involve substantial costs.
- None of the existing 18 railroad bridges are suitable for highway use and would need to be replaced at a significant cost.
- The vertical clearances for existing railroad structures over Detroit roadways are approximately 12 feet which are substandard. The proposed alternative would require raising the railroad and highway elevations or lowering the crossroads, significantly increasing costs of the alternative.
- Funding of this alternative with federal aid would be uncertain because of the distance from I-94 to the proposed truck route. The truck route would not be a true interstate and would not be eligible for federal funding. The distance would make it difficult to justify the facility as an interstate service facility dedicated to truck use.
- High-speed rail service now under consideration between Detroit and Chicago is currently under consideration within the existing railroad right-of-way. Consequently, it was not certain that the tracks and right-of-way would be removed from rail use.

This alternative would add substantial costs to the proposed project and address the need of only one group of I-94 users (trucks). Moving trucks to this facility would provide only partial relief to current traffic congestion on I-94 and would not satisfy the need to reduce traffic congestion.

4.2.2 Reconstruct I-94: Add HOV Lanes without Improvements to the M-10 and I-75 Interchanges

The proposed alternative would add one high-occupancy vehicle (HOV) lane in each direction on I-94. The HOV lane would be a substitute for a fourth additional general-purpose lane.

HOV lanes, also known as carpool lanes, would be reserved for vehicles carrying a certain minimum number of occupants. Most urban areas have a two-person per vehicle minimum for HOV lanes, but three-person per vehicle minimums are required in some. The purpose of HOV lanes is to reduce the number of vehicles on the roadway.

HOV lanes increase vehicle occupancy to move more people per hour in fewer vehicles than general-purpose lanes. Because HOV lanes typically have lower traffic volumes and higher speeds than adjacent driving lanes, they provide an incentive for motorists to use them. Buses could use the lanes as well. HOV lanes would be located adjacent to general-purpose lanes and would be marked for HOV usage with signs and pavement markings. HOV lanes would be separated from general-purpose lanes by pavement markings, rumble strips, buffer areas, or barriers.

In addition to HOV lanes, this alternative would include the redesign of all entrance and

exit ramps and would eliminate some. Reconstructed ramps would be relocated to provide sufficient distance between ramps to meet current highway design standards. Acceleration and deceleration lanes would also be included as part of this alternative.

This alternative was considered primarily because of its potential to relieve traffic congestion and thereby improve air quality. Congestion and air pollutants would be reduced by moving more people in fewer vehicles. Fewer vehicles would translate into smoother operating conditions.

As part of this study, an HOV analysis was performed within the study area. A region-wide HOV analysis, Southeast Michigan High-Occupancy Vehicle Feasibility Study, was also done to determine the viability of the concept. Seven counties were included in the study: Wayne, Macomb, Oakland, Monroe, Livingston, Washtenaw, and St. Clair. The I-94 HOV alternative was included in the analysis as part of a larger regional HOV system. To optimize the benefits and be most effective, the HOV lanes would have to extend beyond the study limits of the project. The analysis also found that I-94 did not meet several of the criteria established for candidate HOV facilities. One important criterion was the number of vehicles per hour forecasted to use the HOV facility. Federal Highway Administration (FHWA) guidelines suggest a minimum threshold of 500 vehicles per hour per lane. The forecast indicated that the I-94 HOV alternative would attract only 300 vehicles per hour.

This alternative would not meet the need to reduce congestion or improve operations or safety. Therefore, the alternative was dropped from further consideration.

4.2.3 Reconstruct I-94: Add Unconventional Service Drives without Improvements to the M-10 and I-75 Interchanges

This alternative would add one general-purpose lane in each direction, redesign the ramps, reserve space in the median for future expansion, and add continuous service drives adjacent to I-94 without improving the M-10 and I-75 interchanges. It would provide for "unconventional" continuous service drives on I-94. The Unconventional Service Drives Alternative is illustrated in Figure 4-2.

The service drives would be located parallel to I-94 the length of the project, but would be "unconventional" because they would not be adjacent to I-94 in all locations and would not always be located on both sides of the freeway. In some locations the service drives would shift to one side of the freeway and become a two-way boulevard. The "boulevard" concept for the service drives would address the city of Detroit's economic development objectives by providing access to developing neighborhoods and business areas. The proposed alignment would follow the current alignment from I-96 to the M-10 interchange. Two one-way service drives would join together as they passed through the M-10 interchange. They would then continue north to form a two-way landscaped boulevard along Piquette Avenue. After crossing I-75 to the east, the two-way service drive would run along Harper Avenue to Conner Avenue. After Conner Avenue, the eastbound service drive would cross I-94, parallel the freeway on the south side, and resume the traditional configuration of parallel service drives on either side of I-94

(Figure 4-3).

As the study progressed, concerns were raised regarding the feasibility of the unconventional service drive concept:

- The M-10 and I-75 interchanges are nearly at the end of their useful life. It would not be prudent to exclude reconstruction of them from the proposed project.
- Access to the freeway would be limited.
- A potential would exist for I-94 traffic to seek alternate routes through the residential neighborhoods because the service drive would not be adjacent to the interstate.
- Impacts of relocations and neighborhood disruptions required by alignment of the service drives through neighborhoods would result.
- Traffic and noise would increase in neighborhoods through which the alignments of the unconventional service drives would pass.
- Emergency access to I-94 would be poor.
- In the event of an incident on the interstate, all interstate traffic (including heavy trucks) would be forced to use these routes, which would increase noise levels and vibration in adjacent neighborhoods.

As indicated in Chapter 3 (Project Planning Process), one of the goals of the study is to minimize the adverse impacts resulting from implementation of the proposed project. The concerns regarding impacts of this alternative outweighed its benefits. The alternative would not meet the needs of replacing interchanges, or improving traffic operations and safety on the I-94 mainline. The concept was eliminated from further consideration.

4.2.4 Reconstruct I-94: Add Lanes and Provide Reserved Space for Future Expansion without Improvements to the M-10 and I-75 Interchanges

This proposed alternative would consist of the addition of a general-purpose lane in each direction; three-lane continuous service drives adjacent to I-94 in each direction, and the reconstruction of the existing roadway and bridges on I-94. It would turn I-94 from a six-lane freeway into an eight-lane freeway, but it would not improve the M-10 and I-75 interchanges. The addition of the general-purpose lanes would reduce the level of current and projected traffic congestion on I-94. It would provide reserved space in the median for future expansion. However, because the interchanges would not be improved, they would severely limit the operation of I-94. This alternative would not eliminate left ramps. The alternative was dropped from further consideration for the following reasons:

- The M-10 and I-75 interchanges are nearly at the end of their useful life. It would not be prudent to exclude reconstruction of them from the proposed project.
- An elevated structure to carry additional lanes would be required because the existing interchanges would not be wide enough to accommodate additional lanes. An M-10/I-75 interchange "fly over" would begin between the I-96 and M-10 interchanges and would terminate east of the I-75 interchange. An elevated structure of the necessary length would significantly add to the cost of the project.
- Without improving the interchanges, all segments of I-94 would operate at a Level of Service D or better, but the interchanges would operate at a Level of Service E or

worse and severely limit the operation of I-94.

- Detroit is experiencing a strong economic turnaround. A multi-modal transportation system is desirable and may become necessary in this corridor to address future transportation needs. Not rebuilding the interchanges would exclude the possible use of the reserved space for other transportation alternatives such as rail.
- The "fly over" would be aesthetically displeasing to people living in the area.

The alternative would not meet safety, congestion, or operational improvement needs. It was eliminated from further consideration.

4.2.5 Reconstruct I-94: Improvements to the M-10 and I-75 Interchanges with Collector-Distributor Roads

This proposed alternative would consist of the addition of one general purpose lane in each direction, acceleration/deceleration lanes, continuous service drives, and the reconstruction of the existing roadway and bridges on I-94. It would also include reserved space in the median to accommodate future expansion. The alternative would upgrade the M-10 and I-75 interchanges with collector-distributor roads that collect traffic from the mainline and distribute it to other roads. Figure 4-4 shows an example of collector-distributor roads.

The collector-distributor road is separated from the mainline and allows no access to abutting property. To access an exit ramp, traffic must exit the mainline onto the collector-distributor road prior to the exit ramp and then access the ramp from the collector-distributor road. To access the mainline, traffic would use the entrance ramp to access the collector-distributor road that has an entrance onto the mainline. The purpose of the collector-distributor road is to reduce weaving.

This proposed alternative addresses many of the goals of the study, such as improved mobility and access within the project area. It would also provide added safety by reducing weaving on the mainline.

Because of the extra amount of right-of-way required to construct collector-distributor roads, the alternative requires the acquisition of more right-of-way than the alternatives that improve the interchanges with continuous service drives or braided ramps. The M-10 collector-distributor would begin near Pallister Avenue and end south of Forest Avenue. The I-75 collector-distributor would begin north of Clay Avenue and end at Canfield Avenue. The M-10 and I-75 interchanges would both be rebuilt to have right-on and right-off ramps. The Pallister Avenue on-ramp to southbound M-10 and the Melbourne Avenue/Seward Avenue on-ramp to northbound M-10 would be removed with this alternative. The Warren Avenue ramps would no longer be braided with the I-75 interchange.

This alternative was eliminated from further consideration because when compared to the Continuous Service Drives Alternative, it would require the acquisition of more residential units and businesses without corresponding additional benefits.

4.2.6 Reconstruct I-94: Original Design of Improvements to the M-10 and I-75 Interchanges with Continuous Service Drives

This proposed alternative would consist of the addition of one driving lane in each direction on I-94, acceleration/deceleration lanes, three-lane continuous service drives on each side of I-94, and reconstruction of the pavement, retaining walls, ramps, and bridges on I-94. It would also include reserved space in the median to accommodate future expansion. This alternative would reconstruct the M-10 and I-75 interchanges with three-lane, one-way continuous service drives on each side of I-94, M-10, and I-75 through the interchanges to allow local traffic to travel through the interchanges. It would remove all left ramps and replace them with right entrances and exits. Figure 4-5 provides an example of a continuous service drive through an interchange.

The two additional mainline lanes would be used by all types of vehicles and would result in an eight-lane I-94. The addition of two driving lanes would help reduce current and future congestion on I-94. Acceleration and deceleration lanes would eliminate some weaving and improve safety and capacity. The redesign of I-94 would not preclude future expansion of I-94. The reserved space in the median could be used for transit, and the height of the bridges would accommodate future transit use, even though transit is currently not considered for implementation as part of the project.

This alternative would require the acquisition of the Research Park Apartments, a building that houses several hundred residents who would require relocation. The Fourth Street neighborhood would also be acquired and its residents relocated. For these reasons, this alternative was eliminated but many of its design concepts were included in a refined alternative.

4.2.7 Refinement of Design of Improvements to the M-10 and I-75 Interchanges with Continuous Service Drives

The concepts of continuous service drives and reconstructed interchanges were retained in this alternative, but the displacement of the residents of the Research Park Apartments and the Fourth Street neighborhood was avoided. However, the Fourth Street neighborhood would be located between the mainline roadway and the new service drive.

The Refined Continuous Service Drives Alternative was further refined to reduce right-of-way acquisition and improve access along the remainder of the project.

This alternative was dropped from further consideration because it did not provide the desired access from M-10 and I-94 to the New Center Area via Milwaukee Avenue and the Wayne State University area via Warren Avenue.

4.2.8 Reconstruct I-94: Original Design of Improvements to the M-10 and I-75 Interchanges with Braided Ramps

This alternative would reconstruct the M-10 and I-75 interchanges with braided ramps. Braided ramps reduce the amount of right-of-way needed for improvements by

constructing one ramp over the top of another (vertical separation), instead of beside the other (horizontal separation). Figure 4-6 shows an example of braided ramps. No continuous service drives on M-10 and I-75 through the I-94 interchanges would be constructed. This alternative would "braid" the Milwaukee Avenue and M-10 ramps to/from I-94, to the north of I-94, and the Warren Avenue and M-10 ramps to/from I-94 to the south of I-94. On I-75, the Milwaukee Avenue ramps would be braided with the I-75 ramps to/from I-94. The M-10 and I-75 interchanges would both be rebuilt with right on- and off-ramps. This proposed alternative would provide the same improvements on I-94 as described in the previously mentioned alternative: one additional driving lane in each direction, three-lane continuous service drives on I-94, acceleration/deceleration lanes, reconstruction of retaining walls, ramps, and bridges, and reserved median space.

This alternative would require the acquisition of the Research Park Apartments and the Fourth Street neighborhood and the subsequent displacement of residents of both. This alternative was eliminated from further consideration, but many of its design concepts were included in a refined alternative.

4.2.9 Refined Original Design of Improvements to the M-10 and I-75 Interchanges with Braided Ramps

The concept of braided ramps and reconstructed interchanges was retained, and the displacement of Research Park Apartment residents was avoided. However, the braided ramps located at the Fourth Street neighborhood remained and would still require the acquisition of the structures in the neighborhood.

This alternative was dropped from further consideration because of its adverse impact to the Fourth Street neighborhood and the lack of continuity of the service drives.

4.2.10 Modifications to Existing Transit Service in the I-94 Corridor

Modifications to existing transit service was considered as an alternative. Without improvement to the project corridor, the service drives would not be continuous along I-94. Bus stops could not be conveniently located along I-94. This limits the capacity of transit to carry significant passengers. Furthermore, the HOV study indicated that although the HOV lane would include buses, an HOV lane would not carry enough vehicles to justify the HOV lane. Therefore, transit by itself could not significantly reduce the level of congestion experienced on I-94 and would not improve deteriorating conditions or aesthetics.

4.3 Alternatives Retained for Further Study: The Practical Alternatives

The Practical Alternatives are the alternatives retained for further study and consist of No-Build, Enhanced No-Build, and Build alternatives. The No-Build and Enhanced No-Build alternatives are retained as bases of comparison to the Build Alternative. The Build Alternative is a result of refining alternatives to produce a build alternative that reduces the amount of right-of-way and relocations required while maintaining the

continuous service drives concept.

4.3.1 No-Build Alternative

The No-Build Alternative is retained as a bench mark or basis of comparison for the Build Alternative. The No-Build would maintain I-94 between I-96 and Conner Avenue in its existing configuration, alignment, and location. No changes would be made. Only routine maintenance would occur to the existing facility on an as-needed basis. Bridges would be replaced if physical conditions would warrant replacement. Traffic would remain congested and become more so during maintenance, and safety would not be improved. The No-Build Alternative does not meet the purpose and need of the proposed project.

4.3.2 Enhanced No-Build Alternative

This alternative would provide minor improvements over the No-Build Alternative by reconstructing I-94 on the current alignment with the existing design and limited improvements to shoulders and ramps. It includes construction of acceleration/ deceleration lanes, auxiliary lanes, and shoulders. Due to the age and condition of the existing pavement and bridges, the Enhanced No-Build Alternative was designed to include replacement of bridge structures, ramps, and pavement. This alternative would provide no major changes to the existing design of I-94 and the M-10 and I-75 interchanges. The Enhanced No-Build Alternative would do little to ease congestion. Safety would be marginally improved if acceleration/deceleration lanes, and auxiliary lanes were added. It would cost less than the Build Alternative but more than the No-Build Alternative.

Bridges on I-94 would be reconstructed as they exist today. Additional auxiliary lanes would be added. The existing service drives would be resurfaced but not extended to make them continuous. The existing configurations of the M-10 and I-75 interchanges would be maintained. The left exits on the I-94/M-10 interchange would be retained. The Enhanced No-Build Alternative would not meet one of the project's goals, that of improving mobility. During peak periods, I-94 would operate at a Level of Service E or worse. This situation would become worse in the future because traffic is predicted to increase by more than 25 percent by 2020.

Without eliminating left exits, which cause weaving between the I-96/M-10 and the M-10/I-75 interchanges, no significant improvement would be made to safety. However, this alternative is retained for further study as a Practical Alternative because it marginally improves safety with the addition of acceleration/deceleration lanes, and auxiliary lanes and results in fewer adverse impacts than the Build Alternative. Traffic crash data for I-94 segments, including the two interchanges, are contained in Appendix B.

4.3.3 Build Alternative: Refined Design of Improvements to the M-10 and I-75 Interchanges with Design Elements of Continuous Service Drives and Braided Ramps

The Build Alternative combines key design elements from both the Refined Continuous Service Drives Alternative and the Refined Braided Ramp Alternative. This proposed alternative is a result of efforts to address public concerns expressed at public meetings, as well as city of Detroit concerns regarding neighborhood cohesion and the number of residential, commercial, and industrial impacts. In response to these concerns, an engineering value planning team was convened to refine and modify design of the I-94 interchanges with M-10 and I-75. As a result of the value planning process, significant design enhancements were identified and property and displacement impacts reduced.

The Build Alternative would include the addition of one driving lane in each direction on I-94, auxiliary and acceleration/deceleration lanes, three-lane continuous service drives on each side of I-94, and reconstruction of the pavement, retaining walls, ramps, and bridges on I-94. It would also include reserved space in the median to accommodate future expansion or transit. This alternative would reconstruct the M-10 and I-75 interchanges with three-lane, one-way, continuous service drives on each side of M-10 and I-75 through the interchanges to allow local traffic to travel through the interchanges. Additionally, braided ramps would be constructed within the I-94/M-10 and I-94/I-75 interchanges to provide access to and from the adjacent street network.

The I-94/M-10 interchange provides access to the New Center Area and Wayne State University. To access the New Center Area, a braided ramp from northbound M-10 to the northbound service drive and a slip ramp from the I-94 mainline to the northbound M-10 ramp to the northbound service drive would be provided. Similarly, to access the Wayne State University area, a braided ramp from southbound M-10 to the southbound service drive and a lane drop from the I-94 to southbound M-10 ramp to Forest Avenue would be constructed. A lane drop in this area would mean that one of the two I-94 on-ramps to southbound M-10 becomes the Forest Avenue off-ramp. An additional lane would be constructed from Milwaukee Avenue to the I-94 off-ramps along southbound M-10 and from Forest Avenue to the I-94 off-ramps along northbound M-10. All left entrance and exit ramps would be removed and replaced with right entrance and exit ramps. The eastbound and westbound service drives would be continuous through the interchange. Continuity of the northbound and southbound service drives would be provided by advance U-turn structures located at Trumbull Avenue and Second Avenue.

The I-94/I-75 interchange provides access to Warren Avenue in various ways. Warren Avenue would have direct access to northbound I-75 via a braided ramp and direct access to the I-94 ramp. Warren Avenue could be accessed from southbound I-75 via a braided ramp to the southbound service drive. Access from I-94 to Warren Avenue would be provided using the I-94 service drives. A braided ramp from eastbound I-94 to the eastbound service drive would be constructed to provide access to the Detroit Solid Waste Facility, and a braided ramp from westbound I-94 to the westbound service drive would be constructed to provide access to Beaubien Street and Brush Street. An additional lane would be constructed between Clay Avenue and the I-94 off-ramps along southbound I-75. A lane drop from the I-94 to northbound I-75 system ramp to Clay Avenue would be constructed to provide access to the New Center Area. A lane drop in this area would mean that one of the two I-94 on-ramps to northbound I-75 becomes the

Clay Avenue off-ramp. The eastbound service drive is continuous through the interchange. Continuity of the westbound, northbound and southbound service drives would be provided by advance U-turn structures located at East Grand Boulevard, Russell Street, and Brush Street.

The two additional mainline lanes (one lane in each direction) would be used by all types of vehicles and would result in eight lanes on I-94. The addition of two driving lanes would help reduce current and future congestion on I-94. The redesign of I-94 would not preclude future transit use along the corridor. The reserved space in the median could be used for transit and the height of the bridges would accommodate future transit use, even though transit is currently not considered for implementation as part of the project.

One of the key elements in assuring pedestrian mobility would be pedestrian access across the facility. The Build Alternative would replace existing pedestrian structures with new enhanced pedestrian walkways where feasible. The pedestrian walkways would be at the same level as the vehicular bridges and both would cross over the mainline facility. Access across the service drives would be controlled with pedestrian signals. The walkways would be 19.7 feet wide and incorporated into the service drive U-turn structures. As an example, Figure 4-7 illustrates the placement and design of the proposed pedestrian structures at Kettering High School. Pedestrians would be able to safely and conveniently cross the new facility. The locations of each proposed pedestrian walkway would be discussed with the public and evaluated for feasibility prior to construction.

The Build Alternative reduces right-of-way acquisition and impacts within the project area. It avoids the acquisition of Research Park Apartments and reduces acquisitions in the Fourth Street neighborhood to one residential acquisition and one commercial acquisition. The parking lot that serves the Research Park Apartments would be modified, so an additional lot would be constructed to replace parking removed from the existing lot.

In summary, the Build Alternative includes:

- Addition of one driving lane in each direction
- Construction of three-lane continuous service drives with sidewalks on I-94 and on M-10 and I-75 through the I-94 interchanges
- Removal of all left entrance and exit ramps
- Construction of right entrance and exit ramps
- Addition of auxiliary and acceleration/deceleration lanes
- Reconstruction of the pavement, retaining walls, ramps, and bridges on I-94 and north and south of I-94 on M-10 and I-75
- Reserved space in the median for future expansion
- Braided ramps within the I-94/M-10 interchange to provide improved local access
- Braided ramps within the I-94/I-75 interchange to provide improved local access
- Enhanced pedestrian walkways to preserve non-vehicular mobility across I-94
- Avoidance of the acquisition of Research Park Apartments
- Substantial reduction of Fourth Street neighborhood acquisitions

The Build Alternative replaces the original and refined designs of the Continuous Service drives Alternative and the Braided Ramp Alternative. The conceptual design plan of the Build Alternative is found in Chapter 13 (Build Alternative Conceptual Design Plan).

4.4 Comparison of Practical Alternatives

4.4.1 Advantages

Advantages of each of the three Practical Alternatives are listed below.

4.4.1.1 No-Build Alternative

- Is the least expensive of the Practical Alternatives
- Involves the least interstate traffic disruption during construction
- Requires no right-of-way acquisition or commercial or residential displacements

4.4.1.2 Enhanced No-Build Alternative

- Replaces deteriorating pavement and bridges
- Provides new auxiliary lanes, and acceleration/ deceleration lanes
- Involves less expense than the Build Alternative
- Requires no right-of-way acquisition or commercial or residential displacements
- Slightly enhances safety and traffic flow by the addition of auxiliary, acceleration, and deceleration lanes

4.4.1.3 Build Alternative: Refined Design of Improvements to the M-10 and I-75 Interchanges with Design Elements of Continuous Service Drives and Braided Ramps

- Provides new pavement, bridges, auxiliary lanes, acceleration and deceleration lanes, and retaining walls
- Provides one additional driving lane in each direction
- Eliminates left entrance and exit ramps
- Provides continuous service drives on I-94 and on M-10 and I-75 through the I-94 interchanges
- Provides sidewalks and wide multi-use outside lanes on continuous service roads
- Provides shoulders on I-94 for disabled vehicles
- Provides braided ramps within the I-94/M-10 interchange for improved local access
- Provides braided ramps within the I-94/I-75 interchange for improved local access
- Provides enhanced pedestrian walkways for neighborhood cohesion
- Reserves space in the median for future expansion or transit facilities
- Avoids acquisition of Research Park Apartments
- Reduces Fourth Street neighborhood acquisitions to one residence and one commercial property
- Meets the purpose and need of the project and the goals of the study better than the No-Build or Enhanced No-Build alternatives
- Updates the design of the freeway to:
- Reduce weaving movements
- Enhance safety
- Improve traffic flow and reduce congestion
- Provide opportunities for transit on the continuous service roads and in the reserved median space
- Accommodates pedestrians on service drive sidewalks and bicyclists on service drives

4.4.2 Disadvantages

Disadvantages of the Practical Alternatives include:

4.4.2.1 No-Build Alternative

- Replaces deteriorating bridges and pavement on an as needed basis
- Requires frequent maintenance of pavement and bridges
- Involves repairs that would not be cost effective
- Involves traffic disruption during maintenance
- Does not meet purpose and need for the project or the goals and objectives of the study because it:
  a. Does not update the design of the freeway
  b. Does not improve mobility
  c. Does not reduce weaving movements
  d. Does not enhance safety

e. Does not improve traffic flow or reduce congestion
f. Does not provide opportunities for transit on the continuous service drives or in the reserved median space

4.4.2.2 Enhanced No-Build Alternative

- Requires disruption during reconstruction of mainline and bridges
- Does not meet purpose and need for the project or the goals and objectives of the study because it:
  a. Does not update the design of the freeway
  b. Does not improve mobility
  c. Does not reduce weaving movements
  d. Does not substantially enhance safety
  e. Does not improve traffic flow or reduce congestion
  f. Does not provide opportunities for transit on the continuous service roads or in the reserved median space

4.4.2.3 Build Alternative (Refined Build Alternative with Design Elements of Braided Ramps and Continuous Service Drives Alternative)

- Costs more than the No-Build or Enhanced No-Build alternatives
- Requires traffic disruption during construction
- Requires some acquisition of property, houses, and businesses
- Requires relocations of some businesses and residents

4.5 Transportation Measures Compatible with Practical Alternatives

This section describes transportation actions that were originally proposed as stand-alone alternatives, but by themselves did not meet the purpose and need of the project or the goals and objectives of the study and were eliminated. These transportation actions depend upon the Practical Alternatives to facilitate their usefulness and are complementary to them. In conjunction with the Practical Alternatives, they would enhance the efficiency of I-94, the M-10 and I-75 interchanges, and the transportation system of the project area.

4.5.1 Transportation Systems Management (TSM)

Transportation Systems Management (TSM) involves activities or strategies that improve the operational efficiency of transportation systems. The proposed improvements described in this section would consist of less capital-intensive enhancements designed to increase the capacity of the freeway through operational improvements. TSM strategies include ramp metering, Incidence Management and freeway courtesy patrol, Intelligent Transportation System (ITS), and Incident Management and could be implemented with any of the Practical Alternatives.

ITS uses surveillance, monitoring, and communication technologies to manage traffic flow. Such systems are used to facilitate incident management strategies to mitigate congestion caused by traffic crashes, disabled vehicles, or roadway maintenance activities.

MDOT has extensive experience in the use of ITS to improve freeway operations. In fact, some elements of ITS technology, such as changeable message signs, are currently in operation on I-94. Future elements of the system on I-94 would be coordinated with the Michigan Intelligent Transportation Systems Center (MITSC). The Recommended Alternative would allow for the installation of communication technologies that may be needed in the future. The National ITS Architecture, a system to insure national system compatibility, would be followed.

Among the ITS tools are:

- Fiber optic cable that transmits travel information via variable message signs, changeable speed limit signs, and ramp metering.
- Vehicle detection systems that use buried loop detectors, video image processing, automatic vehicle identification, or closed-circuit camera control to count vehicles.
- Traffic surveillance systems that use closed circuit television or low-frequency and ranging radar to detect speed, congestion, or incidents.

4.5.2 Transit

Transit, sometimes referred to as public transportation, is an effective way of moving large numbers of people to their destinations. Different modes of public transportation are distinguished based on the type of hardware they use, the types of service they provide, and the manner in which they operate. The modes range from taxicabs that provide flexible door-to-door service using automobiles to commuter rails that provide train service between downtown terminals and suburban areas of major cities.

SEMCOG – The Southeast Michigan Council of Government adopted its new 2025 Regional Transportation Plan (RTP) in June 2000. SEMCOG is the Metropolitan Planning Organization responsible for developing the multi-modal regional transportation plan. The 2025 RTP calls for investing slightly more than six billion dollars in transit, primarily to maintain existing service in southeast Michigan. However, the plan recognizes and advocates for higher investments in transit to meet current and future transit needs that would be tied to the development of the regional transit vision

Improvement to transit was originally considered as an alternative but was eliminated as a stand-alone alternative for the I-94 Rehabilitation Project because it would not meet the purpose and need of the study. Transit alone could not carry enough passengers needed to make a significant impact on the existing and projected congestion along I-94. Also, it would not improve the existing deteriorated pavement and bridges that would still need to be replaced, and it will have minimum impact on safety. However, with the limited number of people anticipated to use transit, it can be expected to play a supplementary role to relieve congestion and improve air quality. Therefore it was retained as an alternative compatible with the Practical Alternatives. It is expected that congestion

would continue to grow and that the additional widening of I-94 in excess of that proposed in the Build Alternative is not feasible. Further widening would be associated with significant additional acquisitions of residences and businesses. Other alternatives, such as transit, in lieu of further widening of the I-94 freeway would need to be developed in concert with local land planning and land management initiatives to address transportation demand within the corridor.

Three transit options could be implemented within the I-94 project area along with the Build Alternative:

- Modifications to existing transit service in the I-94 corridor
- Bus Rapid Transit (BRT) in the median of I-94
- Light rail

4.5.2.1 Existing Transit Service

The Detroit Department of Transportation (DDOT) provides bus service primarily within the city of Detroit. The Suburban Mobility Authority for Regional Transportation (SMART) provides service primarily within the suburbs but also offers express and local bus service from the suburbs to Detroit service centers in the Central Business District (CBD). These transit providers do not currently transport passengers on I-94, although many of the routes cross or run parallel to I-94.

DDOT operates approximately 54 local routes and four limited (express) routes. Limited routes offer fewer stops, thereby reducing travel times, and operate during the peak periods of the day. Appendix C contains maps of DDOT's service routes in the vicinity of the corridor. The CBD routes (primarily north-south routes) and the cross-town routes (mainly east-west routes) service the project area. Most of the DDOT routes traverse the project area to serve downtown and cross-town destinations. Residents of the project area use these routes to travel to various destinations within and outside the area.

Three of DDOT's major transit facilities are located within the project area:

- DDOT Headquarters (located north of I-94 at Saint Antoine) – Administrative functions and bus maintenance facility
- Gilbert Terminal (located at Hudson and Wabash)– Dispatch facility for 166 buses
- Shoemaker Terminal (located at Saint Jean and Shoemaker) – Dispatch facility for 187 buses

Ten SMART routes to downtown Detroit cross I-94. The SMART service routes in the vicinity of the project area are shown in Appendix C. The rest of the routes operate on either other freeways in the region, other parts of I-94, or surface arterials. The number of weekday SMART riders is approximately 32,300. The number of Saturday and Sunday riders is approximately 15,000 and 5,000 respectively. Approximately 29 percent of the trips are from the suburbs to Detroit, 19 percent are from suburb to suburb, 33 percent are from Detroit to the suburbs, and 17 percent are within Detroit.

The Build Alternative provides an opportunity to improve existing transit in the I-94 project area. Improvements would include modifications to existing bus routes and increased transit service. The proposed Build Alternative would allow transit operators to provide better services for residents and surrounding businesses. The Build Alternative would include continuous service drives on I-94 and reserved space for future expansion of I-94. The service drives could be used to provide and integrate transit services within the project area and the city of Detroit.

A redesigned I-94 would also encourage the development of transit service hubs. Transit service hubs are locations where different types of transportation come together and passengers transfer from one type to another. These hubs increase travel options, decrease travel time, and contain costs.

DDOT is reviewing the possibility of developing transportation hubs in Detroit along I-94 at the Gratiot Avenue, Woodward Avenue, and Wyoming Avenue interchanges. In addition, future facilities east of Detroit at I-696 and at 23 Mile Road, as well as west of the city at M-39 and I-275, are being considered. These hubs would provide the public with more direct and speedy travel, particularly for destination points outside of downtown Detroit. For example, to travel from an east-side service hub to the west side, a passenger could transfer to an express bus utilizing I-94 for fast travel to a west-side hub. This approach deceases travel time and increases travel options, two important factors in promoting the use of transit services.

In conjunction with the rehabilitation of I-94, an opportunity exists to coordinate transportation modes such as automobiles, line-haul buses, paratransit buses, trains, taxis, and inter-city buses. There is also an opportunity to coordinate service providers including SMART, DDOT, and other public and private providers of various transportation modes.

The new intermodal passenger facility planned for a site directly south of the present Amtrak station on Woodward Avenue near I-94 would enhance transit service. At this location, passengers could transfer between rail and bus service. For example, an express shuttle service could take passengers from the facility to destinations along the redeveloped Woodward corridor.

4.5.2.2 Bus Rapid Transit (BRT)

Bus Rapid Transit, or BRT, involves a total systems approach to the supply and operation of a bus based rapid transit service. The flexibility of the bus to operate on different types of right-of-way and under different operating conditions means that BRT encompasses significant variations in guideways, stations, vehicles, ITS technologies, and operating strategies.

BRT on I-94 would provide stations at closer spacing and still serve land uses beyond a convenient walking distance of the busway. This would be accomplished through the use of express and limited-stop services. BRT is recognized as a legitimate precursor to rail. This option could be located in the I-94 median for the Build Alternative or on the

mainline for the No-Build Alternative.

Early in the I-94 Rehabilitation Project study, exclusive bus facilities were proposed as either a substitute for a fourth traffic lane or a candidate for the reserved space in the median. In the HOV study, the estimates of future ridership did not justify an exclusive bus lane at this time. Therefore, this alternative was dropped from consideration as a substitute for an additional driving lane.

A travel information survey was conducted in the fall of 1995 to supplement existing travel information. The survey indicated that 46 percent of I-94 trips had a Detroit destination. Less than 13 percent of all trips using I-94 during peak periods begin and terminate in Detroit. Because the project area is entirely within the city of Detroit, a BRT alternative would only serve those whose origin and destination are within the project area limits. It is possible that commuters from outside the city of Detroit might use BRT if convenient park-and-ride facilities were provided.

Based on results from the travel information survey, less than 2 percent of commuters would likely use transit service on I-94. Therefore, this alternative would not have an appreciable impact on current and future congestion. However, future improvements along I-94 would not preclude the possibility of an exclusive busway if and when conditions justify such an investment.

4.5.2.3 Light Rail in the I-94 Median

The Light Rail Transit Alternative could use facilities constructed in the median of I-94. Sufficient distances between stations would be required to reduce the number of stops and travel time for users. The design would be determined later but would be similar to those operating in other cities such as Chicago. Vehicles operating singly or in short trains would run on tracks in the median of I-94. This alternative is proposed as a candidate for the reserved space in the median of the Build Alternative.

The alternative was eliminated from further consideration as a substitute for a fourth additional lane because the estimated 20-year ridership forecasts would not justify the major investment necessary to build and maintain rail operations. The Southeast Michigan Regional Rail Study (DeLeuw 1997) identified the Ann Arbor–Detroit corridor as one of the three most promising rail corridors in southeast Michigan. I-94 is part of that corridor. The study projected a daily passenger boarding of approximately 6,681 for the year 2015 for the Ann Arbor–Detroit corridor.

This passenger estimate is less than 2 percent of the total person-trips in the portion of I-94 currently under study. The estimated ridership would not significantly impact current and future congestion on I-94. To be effective, rail on I-94 would have to extend a greater distance than the project length and include origins and destinations outside of the project limits. A system-wide study would be necessary to identify the optimal distance and origins and destinations.

Downtown Detroit is experiencing a significant economic growth. Major land use

developments have moved from the planning stage to implementation. These include consolidation of the General Motors headquarters, three new casinos, residential and office developments, and two new sports stadiums. These facilities enhance conditions for rail development by providing major trip attractions. Successful implementation of a light rail transport system requires significant concentration of activities within a specific geographic area. The Build Alternative would allow for possible construction of passenger rail facilities in the reserved median space or along the service drives if and when conditions justify such an investment and rail service becomes feasible.

4.5.2.4 SEMCOG Transit Vision

SEMCOG is the appropriate forum for the discussion of regional transit issues and their relation to the highway network. SEMCOG is responsible for developing the multi-modal Regional Transportation Plan. Several transit initiative studies have begun. Foremost among transit initiatives is the Southeast Michigan Transit Vision. The effort began in August 2000 and actively engages the community to develop a Regional Vision for Transit. The first community meeting was held August 10, 2000 at Cobo Hall in Detroit with approximately 150 in attendance.

SEMCOG's Executive Committee adopted the 2025 Regional Transportation Plan for southeast Michigan in June 2000. In that plan, SEMCOG noted the lack of comprehensive public transit service in southeast Michigan. As a future initiative, the Plan noted that "SEMCOG will continue developing its appropriate role in regional public transit".

The Plan went on to discuss the public's perception of transit, noting that a positive public perception is crucial in transit's future success. Transit must become viewed as a viable, attractive travel option for all people and not solely a last resort for the transit dependent.

The Plan explained, "regional transit needs must be more fully understood and prioritized". A commitment to developing a consolidated, long-term transit visions for the region is required. Such a regional vision would establish the foundation needed to clearly define needs, specify and prioritize regional initiatives, and promote sustained transit funding efforts.

Support for better regional public transit will remain fragmented and ineffective until a single regional transit vision is crafted and endorsed by local governments, working through SEMCOG, transit operators, the private sector, labor, and the general public. Therefore, SEMCOG will facilitate development of a long-range and comprehensive transit vision for southeast Michigan. SEMCOG's visioning process will include transit providers, government finding agencies, and representatives of the populations served by transit. The end result will be a vision for a regional system representing the most appropriate mix of transit services and generating the public and political will necessary to sustain it.

In addition to development of the regional transit vision, several other studies have been

initiated:

- The Downtown-Airport Rail Study is a study of the feasibility of rail service between downtown Detroit and Detroit Metro Wayne County Airport. The study will be completed in 2001.
- The Woodward Transit Alternatives Study began in 1999 to develop a transit alternative along Woodward Avenue within the city of Detroit. This study has been completed. It identified BRT and light rail technologies as the most promising transit options on the Woodward corridor.
- Bus Rapid Transit Options Study for Southeast Michigan, or Speed Link as it is referred to has just started. The Metropolitan Affairs Coalition (MAC) is sponsoring the initiative. This study will assess the feasibility of BRT in southeast Michigan and identify two or three potential corridors.

It is anticipated that the Southeast Michigan Transit Vision will integrate and define the respective roles of these studies and possible implementation issues that must be addressed for successful implementation of the study recommendations.

Transit is included in the I-94 Rehabilitation Project as a compatible alternative. Although all of the Practical Alternatives would accommodate bus transit options developed by the Regional Transit Plan, the Build Alternative would accommodate all transit options best. As stated in other sections of the DEIS, a significant portion of the households within the study corridor and the City of Detroit do not own automobiles. Transit is also a more viable mode of transportation for the elderly population, the fastest growing population in southeast Michigan. The Practical Alternatives would not preclude the implementation of any of the transit study results. The FEIS will incorporate available results of transit studies.

4.6 Design of the Build Alternative

4.6.1 Typical Section

A typical section illustrating the roadway is shown in Figure 2-7. Each lane and the mainline shoulder would be 12 feet wide. The reserved space in the median would be 54.5 feet wide. Two lanes on the continuous service drives would be 12 feet wide and the third outside multi-use lane would be 16 feet wide. Sidewalks adjacent to the continuous service drives would be 6 feet.

4.6.2 Continuous Service Drives

The Build Alternative would include three one-way, continuous service drives adjacent to the I-94 mainline on both the north and south sides. Currently, some streets such as Harper Avenue parallel I-94, but they are not located along the entire project length. The proposed continuous service drives would parallel the mainline for the length of the project. The service drives would provide access to nearby residences, businesses, and institutions and would separate local and through trips. The service drives could provide alternative access during traffic incidents and maintenance of the mainline. Sidewalks in compliance with Americans with Disabilities Act design guidelines would also be

included.

Continuous service drives would also be added to M-10 and I-75. The southbound M-10 service drive would begin north of West Grand Boulevard and end at the Forest Avenue on-ramp. The northbound M-10 service drive would begin at the off-ramp to Forest Avenue and end north of West Grand Boulevard. The northbound I-75 service drive would begin at the Warren Avenue off-ramp and end at the Clay Avenue on-ramp. The southbound I-75 service drive would begin at the off-ramp to Clay Avenue and end at the Warren Avenue on-ramp. The continuous service drives would not continue straight through the M-10 and I-75 interchanges but would connect to I-94 service drives. An advanced U-turn bridge would be constructed to allow cars to make a U-turn and then reconnect to the M-10 or I-75 service drives (Figure 4-8). The bridges would include enhanced pedestrian facilities to replace any pedestrian bridges that may be removed (Figure 4-7).

4.6.3 I-94 Mainline

The proposed Build Alternative would include addition of one driving lane in each direction, redesign of entrance and exit ramps, and elimination of some ramps. The alternative would lengthen acceleration and deceleration lanes to correct many of the deficient weaving movements. Entrance and exit ramps east of I-75 would be redesigned to provide sufficient distances between them to meet current design standards. A median space reserved for future use would be added (Figure 2-7).

Some bridges over I-94 would be replaced in their existing locations as part of the Build Alternative. Other vehicular and pedestrian bridges would be combined. The public would have the opportunity to comment on replacements and combined bridges prior to construction.

Full auxiliary lanes would be added along portions of I-94 between on- and off-ramps for vehicle merging, acceleration, and deceleration. Acceleration lanes would allow vehicles to accelerate before merging with traffic in the travel lanes. Deceleration lanes would allow vehicles to slow down before exiting I-94. Presently, vehicles trying to enter I-94 move directly from an on-ramp onto the freeway mainline. No acceleration lane is currently available to allow entering vehicles to approach the speed of vehicles already on I-94 and no deceleration lane is provided for vehicles to slow down to exit the freeway.

The locations of auxiliary lanes for eastbound I-94 would be between:

- Mt. Elliott Avenue on-ramp and Van Dyke Avenue off-ramp
- Gratiot Avenue on-ramp and Conner Avenue off-ramp

The locations of the auxiliary lanes for westbound I-94 would be between:

- Conner Avenue on-ramp and Gratiot Avenue off-ramp
- Gratiot Avenue on-ramp and Van Dyke Avenue off-ramp
- Van Dyke Avenue on-ramp and Mt. Elliott Avenue off-ramp
- Mt. Elliott Avenue on-ramp and Chene Street on-ramp

The M-10 and I-75 interchanges would be redesigned to include right on- and off-ramps. Retaining walls would be used along I-94, M-10, and I-75 to reduce right-of-way acquisition and the number of displacements.

The I-94/M-10 interchange provides access to the New Center Area and Wayne State University. To access the New Center Area, a braided ramp from northbound M-10 to the northbound service drive and a slip ramp from the I-94 mainline to the northbound M-10 ramp to the northbound service drive would be provided. Similarly, to access the Wayne State University area, a braided ramp from southbound M-10 to the southbound service drive and a lane drop from the I-94 to southbound M-10 ramp to Forest Avenue would be constructed. A lane drop in this area would mean that one of the two I-94 on-ramps to southbound M-10 becomes the Forest Avenue off-ramp. An additional lane would be constructed from Milwaukee Avenue to the I-94 off-ramps along southbound M-10 and from Forest Avenue to the I-94 off-ramps along northbound M-10. All left entrance and exit ramps would be removed and replaced with right entrance and exit ramps. The eastbound and westbound service drives would be continuous through the interchange. Continuity of the northbound and southbound service drives would be provided by advance U-turn structures located at Trumbull Avenue and Second Avenue.

The I-94/I-75 interchange provides access to Warren Avenue in various ways. Warren Avenue would have direct access to northbound I-75 via a braided ramp and direct access to the I-94 ramp. Warren Avenue could be accessed from southbound I-75 via a braided ramp to the southbound service drive. Access from I-94 to Warren Avenue would be provided using the I-94 service drives. A braided ramp from eastbound I-94 to the eastbound service drive would be constructed to provide access to the Detroit Solid Waste Facility. A new road is proposed east of Russell Street from Ferry Street connecting to the I-94 service drives. A braided ramp from westbound I-94 to the westbound service drive would be constructed to provide access to Beaubien Street and Brush Street. An additional lane would be constructed between Clay Avenue and the I-94 off-ramps along southbound I-75. A lane drop from the I-94 to northbound I-75 system ramp to Clay Avenue would be constructed to provide access to the New Center Area. A lane drop in this area would mean that one of the two I-94 on-ramps to northbound I-75 becomes the Clay Avenue off-ramp. The eastbound service drive is continuous through the interchange. Continuity of the westbound, northbound and southbound service drives would be provided by advance U-turn structures located at East Grand Boulevard, Russell Street, and Brush Street.

Some I-94 ramps would be removed from their current locations and not replaced while others would be removed and replaced at a new location:

- Eastbound I-94 entrance ramp from Wabash Avenue (Fourteenth Street) would be removed and access would be provided via the I-94 service drives.
- Eastbound I-94 exit ramp to John R Avenue would be removed and replaced with an exit to Brush Street.
- Eastbound I-94 exit and entrance ramps to and from French Road would be removed and access would be provided either by the Gratiot Avenue or Conner Avenue ramps.
- From both of these interchanges, the continuous service drives and advance U-turns along I-94 could be utilized.

- Eastbound I-94 entrance ramp from Beaubien Street would be removed and access would be provided via the I-94 service drives.
- Eastbound I-94 exit ramp to Russell Street would be removed and replaced at a new location.
- Westbound I-94 entrance ramp from French Road would be removed and access would be provided either by the Gratiot Avenue or Conner Avenue ramps. From both of these interchanges, the continuous service drives and advance U-turns along I-94 could be utilized.
- Westbound I-94 entrance ramp from John R Avenue would be removed and replaced at Brush Street.

4.6.4 Traffic Impacts

Existing and future traffic conditions and traffic impacts of the Build and No-Build alternatives were assessed. A comprehensive assessment of current and future traffic conditions is documented in the I-94 Rehabilitation Project: Traffic Report, which consists of two volumes plus an addendum to Volume 1. The first volume describes the condition of the current transportation system, existing traffic volumes, and the transportation management programs active in the project area. The transportation system includes pedestrian, automobile, and public transportation modes of travel. Several chapters of the first volume are devoted to surveys of users and parking facilities completed during the study. The addendum contained traffic of I-94 interchanges with M-10 and I-75. The second volume describes the use of various travel demand forecasting and traffic simulation models to assess future conditions, including alternatives tested in this project. The following section presents an overview of the traffic conditions estimated for the alternatives summarized in this section.

To avoid traffic signals or to shorten travel distance, vehicles using continuous service drives might seek alternative routes through neighborhoods. During design this issue would be evaluated. Public input would be an important part of the evaluation. To discourage traffic in neighborhoods, cul-de-sacs on streets connecting to service drives and right-only in or right-only out turns at streets connecting to the service drives would be incorporated into the design where appropriate.

The DDOT buses currently use the Cadillac bridge to service the neighborhood on the east side of the project. This is in addition to other vehicular traffic that use this bridge. This bridge would be removed in the proposed Build Alternative and replaced with vehicular advanced U-turn structures on either side of Cadillac Street. This modification is necessary because of the reconstruction of the I-94/Gratiot interchange. Further discussion with DDOT and the community would continue if the Build Alternative is selected as the Recommended Alternative. Final design of the Recommended Alternative would mitigate any adverse impacts.

A new road is proposed east of Russell Street from Ferry Street connecting to the I-94 service drives. This road would provide better truck access to the industrial facilities east of the I-94/I-75 interchange. Some concerns were expressed by Detroit Department of Public Works staff on the likely impacts of the new road to the Solid Waste Facility. The

Solid Waste Facility operates in conjunction with an adjacent facility, and the proposed roadway might negatively impact their operations because it may divide the two properties. Further traffic and operational analysis of the two facilities and mitigation measures, if necessary, would be undertaken and included in the FEIS.

4.6.5 Traffic Analyses

SEMCOG, the designated metropolitan planning organization for the region, developed regional forecasts of population and employment growth. These growth forecasts, together with observed travel choices in the base year, were used to build models to predict future travel demand. The travel-forecasting model used the regional transportation network adopted by SEMCOG. The model generated trips from approximately 1,500 traffic analysis zones within the region, grouped them to form origin-destination pairs, and allocated trips to the network. The resulting traffic estimates represent a forecast of likely future travel demand and its impact upon the transportation system.

The enhancement and application of the SEMCOG regional travel forecasting model for use in this study is described in a separate document, I-94 Rehabilitation Project: Travel Forecasting Methodology Report. Traffic in the travel-forecasting model was used as input to a traffic simulation model that assessed the operational and design implications of the traffic. The simulation model more accurately pinpointed the source and extent of congestion and bottlenecks in the network. The simulation modeling is described in greater detail in Volume 2 of the traffic report.

The level of congestion is referred to as level of service (LOS). Level of service is a qualitative measure of traffic conditions and is measured on a scale from A to F. LOS A represents the best operating conditions and LOS F represents the worst.

Table 4-1 shows the projected levels of service in the year 2020 for the No-Build and Build alternatives. With the No-Build Alternative and the Enhanced No-Build Alternative, most segments of I-94 would operate at LOS F during both the AM and PM peak hours. The exceptions are during the AM peak hour when eastbound I-94 from Van Dyke Avenue to Gratiot Avenue and Gratiot Avenue to Conner Avenue would operate at LOS D and C, respectively and I-75 to Van Dyke Avenue would operate at LOS E. Westbound I-94 between M-10 and I-96 would operate at LOS D and E during the AM and PM peaks, respectively. The No-Build and the Enhanced No-Build alternatives would not adequately accommodate the projected year 2020 traffic.

Table 4-1
Estimated Levels of Service for 2020

SEGMENT	No-Build and Enhanced No-Build Alternatives		Build Alternative	
	AM	**PM**	**AM**	**PM**
Eastbound I-94				
I-96 to N-10	F	F	C	C
M-10 to I-75	F	F	C	C
I-75 to Van Dyke	E	F	B	C
Van Dyke to Gratiot	D	F	C	D
Gratiot to Conner	C	F	B	C
Westbound I-94				
Conner to Gratiot	F	E	D	B
Gratiot to Van Dyke	F	F	C	C
Van Dyke to I-75	F	F	E	C
I-75 to M-10	F	F	D	C
M-10 to I-96	D	E	C	D

The Build Alternative would operate at LOS D or better for both the 2020 AM and PM peak hours in all sections of the I-94 mainline, except the section of westbound I-94 between Van Dyke Avenue and I-75. This section would operate at LOS E during the AM peak hour.

4.7 Evaluation of the Alternatives in Relation to the Goals of the Study

The effectiveness of the alternatives in meeting the four goals and associated objectives established for this study varies.

4.7.1 Goal 1—Mobility: Maintain and enhance safe and efficient transportation for passengers and freight on I-94 including the M-10 and I-75 interchanges.

A measure of effectiveness used for assessing mobility is travel-time savings per year. Congested conditions are designated by LOS E or F; this means that the congestion is so heavy that vehicles are constantly stopping and starting.

Using current and projected 2020 traffic data, congestion levels were predicted. The No-Build and Enhanced No-Build alternatives would have no appreciable impact on current or future congestion. I-94 would continue to operate at LOS E or worse and would grow

worse with future projected traffic. Increased congestion would adversely impact the economy of southeast Michigan by increasing the cost of travel, which is a significant component of business cost.

The No-Build and Enhanced No-Build alternatives would not reduce the incidence of traffic crashes that result from the weaving associated with left exits and would not reduce the congestion that follows the crashes. Furthermore, no lanes would be added to

facilitate an improved transit service. These alternatives do not meet the primary mobility goals of the study.

The Build Alternative would rebuild the interchanges and eliminate left-hand ramps. This proposed action would significantly reduce the number of traffic crashes caused by weaving and the congestion that follows the crashes. The addition of an extra lane in each direction would reduce traffic congestion, allowing I-94 to operate at LOS D or better. The exception to this would be the southbound I-75 ramp to westbound I-94 that would operate at LOS E. The Build Alternative would reduce travel time by 14 percent.

The Build Alternative would improve traffic congestion caused by traffic incidents. As indicated in Chapter 2, over 40 percent of the congestion in southeast Michigan is caused by traffic incidents. The narrow I-94 shoulders do not allow troubled vehicles to pull completely out of the outside driving lane. The 12 foot shoulders of the Build Alternative would provide parking for disabled vehicles to safely wait for assistance. Wider shoulders would also allow police and emergency vehicles to move around traffic and quickly respond to incidents. The continuous service drives would also reduce incident-caused congestion by providing emergency vehicles alternative routes to respond to incidents. Continuous service drives could also be used as secondary routes by mainline traffic to avoid incidents and minimize traffic congestion.

Truck traffic has been growing steadily on I-94 at a rate of 5 to 7 percent each year. Although no commercial vehicle computer models to estimate future growth are available, SEMCOG is conducting a commercial vehicle survey. Data from the survey will be used to develop a commercial vehicle model for southeast Michigan. The model can be used to determine the effectiveness of the Recommended Alternative for commercial traffic. It is expected that the addition of a lane in each direction and the use of ITS technology to improve commercial traffic operations would meet the study's mobility goal.

The reserved space for future expansion, coupled with the continuous service drives, provides an opportunity to improve transit. The reserved space, if dedicated to transit, would reduce transit travel time and enhance comfort and convenience. The reduction of congestion on I-94 provides the opportunity for express buses to use the freeway. Buses could also utilize the continuous service drives.

The Build Alternative would accomplish the mobility goal's objectives. It would reduce travel times and congestion for I-94 users and improve operations by eliminating weaving in high-volume areas. The Build Alternative would reduce the number of crashes and provide opportunities to improve transit and accommodate increased commercial vehicle demand. It would provide an efficient route for transport of goods to and from international border crossings.

4.7.2 Goal 2—Access and Development: Improve access and enhance economic development potential in the I-94 project area and adjacent areas.

The No-Build and Enhanced No-Build alternatives would not provide additional or improved access to development.

The Build Alternative would provide improved access to residents and the business community by:

- Providing continuous access on I-94 through the M-10 and I-75 interchanges on service roads. In addition, continuous access on M-10 and I-75 through the I-94 interchanges would be provided. Area residents and business patrons would be able to travel from one side of the interchange to the other without using the freeway.
- Increasing local access for residents and businesses by separating local traffic from through traffic. This would aid in reducing congestion and weaving on I-94, as well as increase and improve access for those living and working in the vicinity of I-94.
- Providing right movements from M-10 and I-75 onto I-94. A vehicle traveling northbound or southbound on M-10 would use a ramp from the service drive to connect to the eastbound I-94. From northbound and southbound M-10, there would be continued access to the westbound and southbound service drives. This is also true of the I-75 interchange.
- Improving transit service to residents and businesses by providing continued local access on the service drives. The service drives would provide more efficient travel for easier access to transit. Routes have the potential to become more reliable because congestion would be reduced. The addition of continuous service drives would facilitate expansion of local routes. Residents and workers would have new opportunities to utilize the transit system if service drives promote more efficient bus use.
- Potentially increasing revenue of businesses adjacent to the service drives. Many businesses depend on pass-by traffic to stop and shop. An increase in through and local traffic on the continuous service drives would increase the number of pass-by trips and exposure of businesses to travelers.

4.7.3 Goal 3—Environment: Maintain and enhance the beneficial social, economic, and environmental effects of the project area while minimizing impacts.

The Build Alternative would have more social, economic, and environmental impacts than the No-Build alternatives. These impacts are described in detail in Chapters 5 and 6 and are summarized below. Adverse impacts would also be minimized by adhering to mitigation measures contained in Chapter 7.

4.7.3.1 Social Impacts

The Build Alternative described in this DEIS has been refined and redesigned to significantly reduce impacts, such as acquisition of the Fourth Street neighborhood and Research Park Apartments and displacement of residents, identified in previous alternatives.

Residents of the area would benefit from increased mobility, both vehicular and non-vehicular, of the Build Alternative. The Build Alternative would facilitate revitalization of the communities along I-94. In addition to increased mobility, sidewalks would

enhance recreational opportunities for joggers and recreational walkers.

4.7.3.2 Economic Impacts

The Build Alternative by refinement and redesign of original build alternatives would reduce property acquisition, and therefore reduces loss of property taxes on acquired property. It also would reduce property acquisition and displacements to reduce expenditures to acquire properties and relocate residents. Money and jobs resulting from construction of the project would be added to the local economy.

A rehabilitated I-94 would facilitate revitalization of communities and redevelopment in communities.

4.7.3.3 Land Use

The Build Alternative is compatible with Detroit land use policies and zoning ordinances and would facilitate beneficial land use changes along I-94.

4.7.3.4 Aesthetics and Visual Resources

The Build Alternative would improve the aesthetics of I-94 for travelers and for residents who view the roadway from their homes. Design of the roadway would include design elements to enhance the aesthetics of the roadway and right-of-way. Improved aesthetics of I-94 would facilitate revitalization of neighborhoods and redevelopment within those neighborhoods.

4.7.3.5 Air Quality

Preliminary analysis indicates that the Build Alternative will comply with standards of the Clean Air Act and the State Implementation Plan for Air Pollutants. More analysis would be done after the Build Alternative is included in the State Transportation Improvement Plan (STIP).

4.7.3.6 Noise

Barrier designs to reduce noise impacts for impacted areas would be included in the Build Alternative.

The No-Build and the Enhanced No-Build alternatives would not include barriers for residential areas that have existing noise levels that impact the areas.

4.7.3.7 Vibration

If the Build Alternative were implemented, construction equipment and traffic closer to structures would have the potential to increase vibration of the ground and result in structure damage. Evaluation for potential vibration impacts to properties would be done prior to construction. Measures to avoid or reduce vibration impacts would be developed

for properties. The mitigation measures would be particular to individual buildings.

4.7.3.8 Contaminated Sites

The Build Alternative would include additional investigation and characterization of contaminated sites identified within the corridor. Recommendations for contaminated sites, including requirements for handling impacted soils and implementation of worker safety measures, would be finalized prior to construction and incorporated in final construction plans.

4.7.3.9 Drainage and Water Quality

The Build Alternative would include design features to improve drainage of I-94 and roadway facilities and to improve water quality. The features would be developed and evaluated during design of the proposed facility.

4.7.3.10 Wetlands and Natural Areas

No wetlands or natural areas are located within the rehabilitation project corridor. Therefore, there would be no impacts to wetlands or natural areas.

4.7.3.11 Terrestrial Flora and Fauna

No long-term impacts from any of the alternatives are expected on terrestrial resources within the rehabilitation corridor, primarily because the rehabilitation corridor lies within a developed urban area.

4.7.3.12 Cultural Resources

The Build Alternative would affect one district, Woodbridge Neighborhood Historic District, listed on the National Register of Historic Places. The Build Alternative would result in acquisition of one house, one store, and vacant lots from the district. It would also affect two properties, United Sound Systems Recording Studios and the I-94/M-10 interchange that are eligible for listing on the National Register of Historic Places (NRHP).

To mitigate adverse impacts, relocating the house, store, and United Sound Systems Recording Studios would be considered. The house and United Sound Systems Recording Studios would be recorded to Historic American Buildings Survey (HABS) standards to be stored in the appropriate archives. The I-94/M-10 interchange would be documented to Historic American Engineering Record (HAER) standards.

A Draft Section 4(f) Evaluation to comply with the Department of Transportation Act of 1966 was prepared for the Woodbridge Neighborhood Historic District, the I-94/M-10 interchange, and the United Sound Systems Recording Studios building. The 4(f) evaluation is included in Chapter 6. The chapter discusses avoiding effects, and why avoidance is not possible to the properties.

4.7.3.12 Construction Impacts

Impacts resulting from construction would include increased noise in adjacent neighborhoods and temporary changes in access to neighborhoods, residences, schools, and businesses, slowed travel time and delays, and general inconvenience to the traveling public and adjacent communities. MDOT is committed to reduction of construction impacts.

4.7.4 Goal 4—Cost Effectiveness: Develop an efficient transportation system that maximizes return on limited resources, recognizing that benefits include enhancements to accessibility, community cohesion, job development potential, and service to transit users.

Cost estimates for implementation of the alternatives are shown in Table 4-2. These estimates are based on concept design quantities and unit prices. Items include removal of the old roadway and structures and construction of bridge structures, pavement, retaining walls. Also included are excavation and design costs. The total construction cost includes 15 percent for miscellaneous items, 20 percent for traffic control, and 10 percent for mobilization.

Table 4-2
I-94 Rehabilitation Project Cost Estimates (In Millions, 2000 Dollars)

	No-Build Alternative	Enhanced No-Build Alternative	Build Alternative
Construction	$0	$673	$950
Right-of –Way	$0	$0	$56
Design and Construction Engineering	$0	$169	$238
Total	$16*	$842	$1,244

(*Cost for Pavement Rehabilitation, does not include bridge replacement costs)

The estimated cost of the Build Alternative is between $840 million and $1.2 billion. A utility relocation and construction staging plan would be prepared for the Recommended Alternative and included in the Final Environmental Impact Statement.

Finally the costs of the No-Build alternatives do not recognize the opportunity costs associated with not increasing the capacity of I-94 to meet the needs of growing regional and international trade. While not quantified specifically for I-94, it has been estimated that Michigan's exports to Canada account for 300,000 jobs and Michigan's bilateral trade is equivalent to 22 percent of the gross state product (John Tennant, Consul General, Craine's Detroit Business, August 2000). A substantial portion of this trade flows on I-94. In addition, the region's manufacturing competitiveness depends in part on the availability of an efficient transportation system. Not maintaining I-94 as a viable

trade route, will itself generate substantial costs in terms of foregone economic opportunity.